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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/677,698	09/28/2000	Rajendran Nair	42390.P9239	3386

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EXAMINER

RAO, SHRINIVAS H

ART UNIT PAPER NUMBER

2814

DATE MAILED: 11/29/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/677,698

Applicant(s)

NAIR ET AL.

Examiner

Steven H. Rao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 8-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-7 and 15-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 September 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Priority

Receipt is acknowledged of paper submitted under 35 U.S. C. and 37 C.F. R. Section 1. 114, claiming priority from parent Application U.S. Serial No. 09/677,698 filed on September 28, 2002 which papers have been placed of record in the file.

Continued Prosecution Application

The request filed on 9/8/2000 for a Request for Continued Examination (RCE) under 37 CFR 1.114 based on parent Application No. 09/677,698 is acceptable and a RCE has been established. An action on the RCE follows.

Preliminary Amendment Status

Acknowledgment is made of entry of preliminary amendment filed 9/11 /02 on September 26, 2002.

Therefore claims 1-4 and 15-16 as amended by the amendment and claims 5-7,17-19 as originally filed and claims 20-23 presently newly added are currently pending in the application.

Drawings

New corrected drawings are required in this application because of the draftspersons objections to the drawings for the reasons listed on the enclosed form PTO-948.

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Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings.

The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: The abstract should be in narrative form and generally limited to a single paragraph within the range of 50 to 150 words. The abstract should not exceed 14 lines of text. Applicants' cooperation is appreciated to correct the numerous error in specification and claims which contains grammatical and idiomatic errors.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

I. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1-7 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably

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convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 line 2 recites, " a metal oxide semiconductor transistor with a shifted during manufacture flat band magnitude. "

The phrase "during manufacture " was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

It is noted that the specification page 10 lines 21- page 11 line 4 describes a method of shifting the flat band magnitude, however there is no description what steps are involved during manufacture and wherein the non described manufacturing process the flat band magnitude was shifted.

Claims 2-7 are rejected at least for depending upon rejected claim 1.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1 the phrase "during manufacture " renders the claim indefinite because the term "during manufacture " is not defined in the specification to particularly point the manufacturing process including the starting step , the ending step and wherein in between the two steps does the shifting o f the flat step is carried out. It is suggested that the phrase" during manufacture" be deleted.

Claims 2-7 are rejected at least for depending upon a rejected claim.

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In claim 20, the phrase " a metallic gate electrode to couple to a positive power supply voltage", " gate insulator area", " diffused drain area" " channel area" " diffused source area" is not understood.

Further the prior art, specification or knowledge of one of ordinary skill in the art does not help in clarifying what applicants' intend to include/ exclude by the their above recitation.

Claims 22 and 23 are rejected for at least depending upon a rejected claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stein et al. (U.S. Patent No. 4,055,837 herein after Stein) and Howard (U. S . Patent No. 4,437,139, herein after Howard, both previously applied).

With respect to claim1, to the extent understood, Stein describes an apparatus (device) including : a Mos transistor (fig. 1 # 31, col. 2 lines 7-8) with a "shifted during

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manufacture flat band magnitude." (col. 7 lines 32-35, it is noted that Stein does not specifically state when the shifting of the flat band magnitude occurs).

The limitation "shifted during manufacture flat band magnitude" cannot be given patentable weight because they are taken to be product-by-process limitations and non limiting. A product-by-process claim is directed to the product per se, no matter how actually made. See *In re Fessman*, 180 USPQ 324, 326 (CCPA 1974); *In re Marosi et al.* , 218 USPQ 289, 292 (Fed. Cir. 1983); and particularly *In re Thrope* 227 USPA 964, 966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product " gleaned" from the process steps, which must be determined in a " product by process" claim and not the patentability of the process. See also MPEP 2113. More ever, an old or obvious product produced by a new method is not a patentable product, whether claimed in product-by-process claims or not.

The other limitations of claim 1 namely, a metallic gate electrode coupled to said metal-oxide-semiconductor-transistor and to a positive voltage source. "

Stein does not specifically mention a metallic gate electrode however it is inherent that a NMOs or PMOS are devices will have a metallic gate.

Further, Howard (previously applied to claims 3-4) in col. 3 lines 31 describes a gate made of PtSi which is the same as described in applicants' specification as the instant applicants' metallic gate to form capacitors having high dielectric constant and low leakage currents.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute Howard's metallic gate for Stein's polysilicon gate in Stein's device to form capacitors having high dielectric constant and low leakage currents. (Howard col. 2 lines 15-30).

Further Limitations of claim 1 namely, a metallic source electrode (Stein fig. 2 # 13, source and Howard col. 3 line 31), a metallic drain electrode (Stein fig.2 # 31, drain and Howard col. 3 line 31) and a substrate electrode of said metal-oxide-semiconductor-transistor (Stein 5 or portion above 4 in fig. 2) coupled to each other (Stein fig. 2 # 13, 31 and 5 or region above 4 connected to each other) and to a negative voltage source (5 or region above 4 connected to ground i.e. negative voltage source).

B. Claims 2 to 7, and 15 to 23 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Stein et al. (U.S. Patent No. 4,055,837 herein after Stein) and Howard (U.S. Patent No. 4,437,139 herein after Howard) as applied to claim1 above and further in view of Dawson et al. (U.S. Patent No. 5,851,891, herein after Dawson).

With respect to claim 2, wherein said metal-oxide-semiconductor includes a diffused gate region material with a work function less than -0.56 volts.

Stein and Howard describe a MOS transistor but do not specifically describe the value of its gate function.

However Dawson in col. 2 lines 48-50 describes the formation of IGFETs with any desired gate work function to form devices with low gate resistivities.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to make Stein's device with any desired gate work function as described by Dawson (including those less than 0.56 volts) to form devices with low gate resistivities. (Dawson col.2 line 49, Dawson in col. 4 lines 52-67 and col. 5 lines 1-15 also describes diffused gate material) .

With respect to claim 3 wherein the diffused gate region material is platinum silicate. (Howard col. 3 lines 31).

With respect to claim 4, wherein said diffused gate material is selected from the group consisting of Tantalum nitrate, iridium, nickel and arsenic. (Howard col. 3 lines 30-34).

With respect to claim 15, an apparatus including :

Means for shifting a flat band magnitude in a metal-oxide-semiconductor transistor (Stein col. 7 lines 32-35,) means for coupling a metallic gate electrode of said metal-oxide-semiconductor transistor to a positive voltage source (Howard col. 3 lines 31 and Stein fig.2) and means for coupling a metallic source electrode , a metallic drain electrode , and a substrate electrode of said metal-oxide-semiconductor transistor to a negative voltage source (Stein 5 or portion above 4 in fig. 2) coupled to each other (Stein fig. 2 # 13, 31 and 5 or region above 4 connected to each other).

With respect to claim 16, wherein said means for shifting includes a diffused gate region with a material whose work function is less than 0.56 volts. (Dawson col.2 line 49, Dawson in col. 4 lines 52-67 and col. 5 lines 1-15 also describes diffused gate material).

With respect to claim 17, wherein said material is platinum silicate. (Howard col. 3 lines 31).

With respect to claim 18, wherein said material is selected from the group consisting of Tantalum nitrate, iridium, nickel and arsenic. (Howard col. 3 lines 30-34).

With respect to claim 19, wherein the substrate is heavily doped. (Stein col.2 line 24-26).

With respect to claim 20, to the extent understood, Stein describes an apparatus including a metallic gate electrode to couple to a positive power supply voltage (Stein fig. 2), a diffused gate region with a material whose work function is less than minus 0.56 volts (Dawson col. 2 line 49, see claim 2 above), a gate insulator area (Stein fig.2 # 22 or 23), a channel area coupled to the gate insulator area (Stein fig. 2 area between drain 31 and source 13 coupled to 22 or 23), a diffused drain area coupled to said channel area (Stein fig. drain 31 coupled to the channel) and a diffused source area coupled to said channel area (Stein fig. 2 source 13 coupled to the channel).

With respect to claim 21, wherein said material is platinum silicate. (Howard col. 3 lines 31).

With respect to claim 22, wherein said material is selected from the group consisting of Tantalum nitrate, iridium, nickel and arsenic. (Howard col. 3 lines 30-34).

With respect to claim 23, wherein the substrate is heavily doped. (Stein col.2 line 24-26).

Response to Arguments

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Applicant's arguments with respect to claims 1-7 and 15-19 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Steven H. Rao whose telephone number is (703) 306-5584. The examiner can normally be reached on Monday- Friday from approximately 7:00 a.m. to 5:30 p.m.

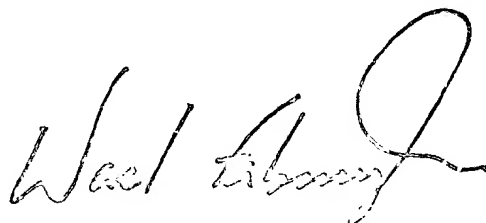
Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0956. The Group facsimile number is (703) 308-7724.



Steven H. Rao

Patent Examiner

Nov. 25, 2002



SUPERVISORY PRIMARY EXAMINER
TECHNOLOGY CENTER 2800